ISLAMIC UNIVERSITY OF SCIENCE & TECHNOLOGY, KASHMIR
OFFICE OF THE RECRUITMENT

Subject: - Shortlisting/Selection Criteria/ Syllabi regarding posts vide Adv. No. 04 and 06 of 2026 dated: 12-06-2026

Notice

It is hereby notified for the information of all concerned who have applied for the different posts advertised ***vide Advertisement Notices No. 04 of 2026 dated: 12-06-2026 and 06 of 2026 Dated: 12-06-2026*** that the syllabi for the posts advertised vide aforementioned advertisement notices is notified as per the details given in **Annexures** to this notice.

Further, the criteria for shortlisting of candidates for interview and final selection shall be as follows:

(i) "Ordinarily 20 candidates shall be shortlisted for one post and 05 more candidates for every additional post".

(ii) The following Criteria shall be adopted for final selection for the posts where the written test is conducted:

Written Test (MCQs) **(80)**	**Interview performance (20)**	**Total (100)**

(iii) For the post of Junior Assistant, type test shall also be conducted for those candidates who will qualify the written test, and only those candidates who will qualify the type test shall be considered for interview. The type test shall be qualifying in nature and no points shall be awarded for it. Further, the criteria for qualifying type test is typing speed of 35 words per minute with 90% accuracy on computer.

NOTE:

a) There will be **negative marking of .25 mark for each wrong answer** in both papers (A&B).

b) The notification for conduct of written test shall be notified separately on the university website www.iust.ac.in

c) A minimum of 50% marks in each of the two papers shall be prescribed as the qualifying threshold. In the event that no candidate secures 50% or more marks in both the papers, the interview shall not be conducted, and no candidate securing less than the prescribed qualifying threshold shall be considered for interview.

Sd/-
REGISTRAR

No: IUST/Reg/Adm/E/26/**603**
Dated: 09/11/2026

ISLAMIC UNIVERSITY OF SCIENCE & TECHNOLOGY, KASHMIR
OFFICE OF THE RECRUITMENT

ANNEXURE-A

POST: (i) Junior Technical Assistant (ii) Junior Assistant (iii) Draftsman (iv) Sports Assistant (v) Medical Assistant (vi) Workshop Mechanic vide advertisement Notice No. 04 of 2026 Dated: 12-06-2026.

PART-A

(Maximum Marks 25) **(Minimum / Qualifying Marks 12.5)**

(A) General English

(i) Comprehension
(ii) Editing / Proof Reading.
(iii) Re-arranging of jumbled sentences
(iv) Narration
(v) Modals
(vi) Articles
(vii) Paragraph writing with blanks to be filled in with: i. Phrases ii. Pronouns iii. Homonyms/Homophones etc.
(viii) Clauses
(ix) Punctuation
(x) Synonyms and antonyms
(xi) Idioms and phrases.
(xii) Uses of Prepositions
(xiii) Active & Passive Voice.
(xiv) One-word substitution.
(xv) Grammar: Noun, Pronoun, Adjectives, Verb, Preposition and Conjunction.

(B) General Knowledge with special reference to JK UT.

(i) Current Events of National and International importance
(ii) Political & Physical divisions of India
(iii) Constitution of India.
(iv) Indian Culture, Heritage and Freedom Struggle/Movement.
(v) Demography- Census, its features and functions.
(vi) Important Rivers & Lakes in India.
(vii) Weather, Climate, Crops, Means of Transport of India.
(viii) J&K UT: a) History b) Economy c) Geography- (Weather, Climate, Crops, Rivers, Lakes, Flora, Fauna etc.) d) Heritage & Culture e) Important Tourist Destinations

(C) Numerical and Reasoning Ability.

(i) Analogies-Semantic, symbolic/Number and Figural.
(ii) Similarities and differences.
(iii) Word Building
(iv) Relationship Concepts.
(v) Number Series
(vi) Coding & Decoding
(vii) Number system,
(viii) Time and distance, time and work.
(ix) Averages, Percentages, Profit & Loss, Ratio & proportions.
(x) Simple/Compound interest.
(xi) Linear equations with two variables.

(D) Basic Concepts of Computers.

(i) Fundamentals of Computer Sciences: Hardware & Software, Input and output devices, Operating systems, Computer languages and basics of networking.
(ii) M.S Office and its application.
(iii) E-mail & Internet.
(iv) E-0ffice, Digitization, File tracking systems, Role of Information Technology in Governance, ERP.

ISLAMIC UNIVERSITY OF SCIENCE & TECHNOLOGY, KASHMIR

OFFICE OF THE RECRUITMENT

Syllabus For Written Test (Domain Knowledge) for the post (s) of (i) Junior Technical Assistant (ii) Junior Assistant (iii) Draftsman (iv) Sports Assistant (v) Medical Assistant and (vi) Workshop Mechanic

(PART B)

(Maximum Marks: 55) **Minimum/Qualifying Marks: 27.5**

(i) Junior Technical Assistant (s)

ARCHITECTURE

UNIT I: Architectural Design Fundamentals & History

- Elements of architecture - point, line, plane, volume, space, form) and principles of design (proportion, scale, balance, rhythm, symmetry, hierarchy, axis, pattern, unity, contrast
- Anthropometry and ergonomics in space planning
- History of Architecture (world and Indian)
- Ancient: Egyptian, Mesopotamian, Greek, Roman.
- Medieval: Gothic, Renaissance.
- Indian: Buddhist, Hindu temple styles (Dravidian, Indo-Aryan, Pallava, Chola, etc.), Indo-Islamic, Mughal, Colonial/Indo-Saracenic.
- Modern & Contemporary: Arts & Crafts, Modernism, Post-modernism;

UNIT II: Building Materials, Construction & Technology

- Stone, brick, and clay products – classification, properties, tests, and uses
- Cement – types (OPC, PPC, PSC, rapid-hardening), setting time, grades, storage
- Concrete – ingredients, water-cement ratio, mix ratios (nominal & design mix), workability, curing
- Steel and structural metals – mild steel, TMT bars, structural sections, corrosion protection
- Timber – classification (hardwood/softwood), seasoning, defects, plywood, laminates, veneers
- Foundations – types (isolated, combined, raft, pile), selection criteria, soil bearing capacity basics
- Masonry – brick bonds, stone masonry, cavity walls, partition walls
- RCC framed structures – beams, columns, slabs, staircases (basic construction sequence)
- Doors, windows, and joinery – types, materials, standard sizes
- Roofing systems – flat roof, pitched roof, RCC roof, sloped/tiled roofs, roof insulation

UNIT III: Architectural Drawing & Computer-Aided Design

- Drawing instruments, sheet sizes (A0–A4), title blocks, and layout conventions
- Scales – plain, diagonal, and their architectural applications
- Conventional symbols and representation of materials, doors, windows, and fixtures as per IS codes
- Site plan, layout plan, floor plan, elevation, and section drawings
- Working drawings
- Orthographic projections – first-angle method
- Isometric and axonometric projections
- Perspective drawing – one-point and two-point perspective basics
- AutoCAD – basic commands, layers, blocks, dimensioning, plotting/printing setup
- Basic awareness of 3D modelling concepts
- Rendering and presentation techniques – basic awareness of visualization software

UNIT IV: Building Bye-Laws & Professional Practice

- National Building Code (NBC) of India – scope and key provisions
- Floor Area Ratio (FAR)/Floor Space Index (FSI), ground coverage, and setback norms
- Height restrictions, parking requirements, and open space regulations
- Building classification as per occupancy (residential, commercial, institutional, industrial)
- Council of Architecture (CoA) – role, functions, and the Architects Act, 1972
- CoA Manual of Professional Practice – code of conduct, scale of fees (overview)
- Roles and responsibilities of an architect, engineer, and technical assistant in a project team
- Basics of tendering, procurement methods, and competitive bidding in architectural services

Planning

Unit I: Planning Fundamentals, Theory & Institutions

- Evolution, scope and principles of planning
- Sustainable urban and regional development
- Types and hierarchy of development plans (Regional, Master, Zonal, Layout)
- Planning organizations, development authorities, DPCs and MPCs
- Urbanization theories (Concentric Zone, Sector, Multiple Nuclei)
- Land use and land value theories (William Alonso)
- Planning theory: rationality, sustainability, public participation
- Planning implementation and evaluation

Unit II: Planning Techniques, Survey Methods & Spatial Data Infrastructure

- Planning data: types, sources, primary and secondary data
- Socio-economic and physical surveys; sampling; questionnaire design
- Land use and density surveys
- Data presentation and report preparation
- Surveying, levelling, total station, GPS
- Remote sensing and aerial photography
- GIS fundamentals, spatial databases and SDI
- Bhuvan, NUIS, NNRMS; geoinformatics applications in planning

Unit III: Quantitative Methods, Computer Applications & Transport Planning

- Descriptive and inferential statistics
- Correlation, regression, hypothesis testing, Chi-square
- Linear programming and transportation models
- Computer applications: MS Office and AutoCAD
- Transport planning concepts, sustainable mobility, PT, IPT and NMT
- Traffic surveys and transport system management
- Urban transport planning and land use–transport interaction

Unit IV: Environmental Planning, Planning Legislation & Site Development

- Sustainable development and environmental planning
- Land use planning and resource conservation
- Environmental Impact Assessment (EIA)
- Site planning and land development
- Topographical surveys and contouring
- Planning legislation, regulations and bye-laws
- Land acquisition laws

Geomatics

Unit I: Remote Sensing Fundamentals, Platforms & Sensors

- EMR concept, spectrum, atmospheric windows, spectral signatures
- Radiation laws (Stefan-Boltzmann, Wien's), blackbody
- Energy interactions in atmosphere and with earth surface (spectral reflectance curve)
- Sensor types: whiskbroom/pushbroom, active/passive
- Resolution: spectral, spatial, radiometric, temporal
- Platforms & orbits: geostationary, sun-synchronous; Kepler's laws
- Popular satellites: IRS, Landsat, Cartosat

Unit II: Photogrammetry, Surveying & GPS

- Aerial photography: vertical/oblique, camera types, scale
- Stereovision, parallax, height determination
- Relief/tilt distortion, rectification, orthorectification, DEM
- Digital photogrammetry: orientation, aerotriangulation
- Field surveying: traversing, levelling, total station
- GPS fundamentals: constellation, segments, NavIC; accuracy factors
- Positioning types: absolute, differential (DGPS), RTK

Unit III: GIS, Digital Cartography, Geospatial Data Management & Geostatistics

- GIS basics: components, spatial/attribute data, raster vs vector
- Data input: digitization, scanning; editing, topology
- Digital cartography: map scales, projections, generalization
- Data models: spaghetti, topological; relational database
- Spatial analysis: queries, overlay, neighbourhood analysis
- Basic C/Python programming concepts
- Geostatistics: correlation/regression, interpolation, Kriging, variogram

Unit IV: Digital Image Processing, Advanced RS Techniques & Applications

- Image pre-processing: rectification, registration, radiometric correction
- Image enhancement: stretching, filtering
- Band ratioing, PCA, vegetation indices
- Classification: supervised/unsupervised (Isodata, K-mean, Max Likelihood), SVM
- Accuracy assessment: error matrix, Kappa statistics
- Thermal RS: emissivity, thermal scanners
- Microwave RS: SAR, radar geometry, interferometry
- Hyperspectral RS basics; LIDAR: principles, DEM applications
- Applications: disaster management, water/soil/LULC, urban planning

Disaster Risk Reduction (CDRR)

Unit-I: Fundamentals of Disaster Risk Reduction and Institutional Framework
Concepts and definitions of hazard: natural and anthropogenic, exposure, vulnerability, capacity, risk, and disaster. Disaster Management Cycle: prevention, mitigation, preparedness, response, search, rescue, relief, recovery, rehabilitation, and reconstruction. Global DRR Frameworks: Yokohama Strategy, Hyogo Framework for Action, Sendai Framework for Disaster Risk Reduction, priorities, targets, and role of academic institutions. Climate Change: greenhouse effect, global warming, sea-level rise, and changing trends in extreme weather events. Disaster Management Act, 2005: institutional framework, legal provisions, offences and penalties. Functions and roles of National Disaster Management Authority (NDMA), National Institute of Disaster Management (NIDM), National Disaster Response Force (NDRF). NDMA Guidelines on Earthquakes, Landslides, and Floods.

Unit-II: Himalayan Tectonics, Engineering Geology, and Mountain Geohazards
Geological structures: folds, faults, joints, and fractures. Tectonic evolution of the Himalayas: Main Central Thrust (MCT), Main Boundary Thrust (MBT), Main Frontal Thrust (MFT), and active fault systems of the Kashmir Basin. Earthquake source mechanisms, elastic rebound theory, seismic waves (P, S, Love, and Rayleigh). Fundamentals of soil mechanics: shear strength, cohesion, liquefaction, and seismic microzonation. Weathering, soil formation, and fluvial and glacial geomorphology. Classification and mechanisms of mass wasting and landslides, triggering factors, factor of safety. Hydro-meteorological hazards: floods, flash floods, cloudbursts, debris flows, and flood mitigation. Cryospheric hazards: Glacial Lake Outburst Floods (GLOFs) and snow avalanches.

Unit-III: Geological Investigations, Geoinformatics, and Hazard Assessment
Geological field mapping: strike, dip direction, dip angle measurements. Laboratory investigations including grain size analysis, Atterberg limits, and direct shear tests. Principles and applications of seismometers, tipping bucket rain gauges, ultrasonic water level sensors, inclinometers, and piezometers. Principles of remote sensing, electromagnetic radiation, passive and active sensors. Spatial, spectral, radiometric, and temporal resolution. Satellite missions and datasets: Landsat, Sentinel, IRS, Cartosat, LiDAR, SRTM, and ASTER. GIS concepts: vector and raster data, coordinate reference systems, topology, attribute management. Spatial analysis: Multi-Criteria Decision Analysis (MCDA), Analytic Hierarchy Process (AHP), overlay analysis, and Land Use/Land Cover (LULC) classification. GPS, DGPS, UAVs/Drones for field surveys, mapping, and post-disaster assessment.

Unit-IV: Project Management and Disaster Risk Management Practices
Project planning and proposal formulation. Critical Path Method (CPM). Budget preparation, expenditure monitoring, and procurement procedures. Field documentation, technical reports, asset inventories, and stakeholder coordination. Community-Based Disaster Risk Management (CBDRM). Disaster Management Plan preparation. Capacity building training programmes. Information, Education and Communication (IEC): posters, booklets, banners, school campaigns, street plays, commemorative events, digital media, and emergency alerts. First responder skills: CPR, fracture stabilization, splinting, search and rescue techniques, knots and lashings, structural collapse marking, casualty carrying methods, and improvised rescue during flood emergencies.

Vocational Studies

UNIT I: ANATOMY AND PHYSIOLOGY

Cell structure and function, Excretory System, Circulatory system, Endocrine system, Digestive system.

UNIT II: CLINICAL MICROBIOLOGY & IMMUNOLOGY

Morphology of bacteria; Bacterial cell wall; spores; flagella and capsules; Bacterial growth and nutrition of bacteria; Sterilization: Physical, chemical and sterilization control; Bacterial culture, Culture techniques and Various Culture Medias; Staining techniques: - Routine as well as Special techniques; Antibiotic sensitivity Methods Principle and clinical importance; Laboratory diagnosis of: U.T.I(Urinary Tract Infection), R.T.I (Respiratory Tract Infection), Enteric Fever; Collection and transportation of various clinical samples, for Culture — Urine, Stool, Sputum, Throat swabs, Pus and Pus swabs, Blood and CSF; General Characteristics, Classification and Structure of viruses; Lab diagnosis of: Hepatitis A, B & C, HIV & H.S.V(Herpes Simplex Virus); Cells & Organs involved in immune system; Antigen, Antibody and complement; Various Serological Tests: - Agglutination, Precipitation and Flocculation reactions; ELISA with various modifications.

UNIT III: HEMATOLOGY & TRANSFUSION MEDICINE

Hemopoiesis: - Erythropoiesis, Leucopoiesis, Thrombopoiesis; Collection and preservation of blood: - venous and capillary; Romanowsky stains: Theory and preparation; Hemoglobin: - Synthesis, function and its degradation; Types of hemoglobin; White cell count: - Total Leucocyte Count, Morphology of White cells; Erythrocyte sedimentation rate (ESR); Packed cell volume (PCV); Laboratory diagnosis of: Iron deficiency anemia, Megaloblastic anemia, Hemolytic anemia, sickle cell anemia and Aplastic anemia; Bone marrow: - Composition and function; Significance of bone-marrow examination; Leukemia: - Classification (FAB); Laboratory diagnosis of various leukemias; ABO Blood Group System; Rh Blood Group System; Anticoagulants used in blood bank; Cross Matching: - Types of cross matching, Various methods and their procedures, Coombs Test: - Direct Coombs test and Indirect Coombs test, Various blood components (Packed cells, Fresh frozen plasma, Cryoprecipitate, PRP (Platelet rich plasma).

UNIT IV: CLINICAL BIOCHEMISTRY

Importance of clinical biochemistry; SI Units and their use; Instruments: -Balance (Analytical, electrical/electronic), Centrifuge, Colorimeter, Spectrophotometer; Carbohydrate Metabolism-Glycolysis, Glycogenolysis, Glycogenesis and Gluconeogenesis; Renal Function; Liver Function; Metabolism of protein; Quality Assurance in Biochemistry as per National Standards; Enzymes; Lipid Profile; Blood Gases.

UNIT V: CLINICAL PATHOLOGY, HISTOPATHOLOGY AND CYTOLOGY

Urine Analysis: Clinical importance of urine analysis; Qualitative analysis of proteins, sugar, bile salts, bile pigments, urobilinogen and blood; Detection of Occult blood; Biological fluids analysis: -peritoneal, pleural synovial & Cerebrospinal Fluid; Semen Analysis; Fixatives: - Composition, types and Classification of various fixatives; Tissue Processing; Microtomy; Theory of staining (Routine): -Principle and mechanism of routine H & E stain; Special stains: - Principle, significance and interpretation of different types of stains PAS (Periodic Acid Schiff's Reagent), Silver impregnation stain for Reticulin fibre, Ziehl Neelson's for AFB and Leprae, Masson's trichrome stain, Oil Red O for fat, Gram's stain for Gram +ve and Gram -ve bacteria; Decalcification: -Process of decalcification, Various types of decalcifying agents, Their mechanism and applications; Frozen Section: -Reception and processing of frozen tissue, Frozen section cutting, Staining, Mounting of frozen section; Cytological Staining: -Principle, Technique and interpretation of results Papanicolaou staining, May Grunwald & Giemsa staining, Cytological Fixatives.

Molecular Medicines

Unit I: Biochemistry and Cell Biology

Biomolecules: carbohydrates, lipids, amino acids, proteins and nucleic acids; protein structure, folding and denaturation; acids and bases, pH and buffers, Henderson–Hasselbalch equation; preparation of solutions and dilution calculations, enzymes, cofactors and coenzymes, enzyme classification, Michaelis–Menten equation, Km & Vmax, competitive, non-competitive and uncompetitive inhibition; cell organization, membranes, organelles, cytoskeleton, cell cycle, and apoptosis; cell signalling; glycolysis, TCA cycle and oxidative phosphorylation.

Unit II: Molecular Genetics, Microbiology and Immunology

Genome organization; DNA replication and repair; transcription, RNA processing and translation; genetic code and regulation of gene expression; lac and trp operons; Mendelian and non-Mendelian inheritance; linkage and recombination; chromosome abnormalities and mutations; bacterial structure, nutrition, growth and cultivation; sterilisation and aseptic techniques; innate and adaptive immunity; immune cells, MHC, antigen presentation, immunoglobulins and complement; hypersensitivity.

Unit III: Tools and Techniques in Biotechnology

Protein expression and purification; restriction enzymes and cloning vectors; DNA cloning and cDNA synthesis; PCR, qPCR and RT-PCR; primer design; site-directed mutagenesis; electrophoresis and blotting techniques; chromatography; centrifugation; ELISA and immunofluorescence; FISH and DNA fingerprinting; animal cell culture, primary cultures and continuous cell lines; DNA/RNA isolation and quantification.

Unit IV: Molecular Basis of Human Disease

Human genome, genetic variation, SNPs and genetic disorders; molecular basis of disease; infectious diseases including tuberculosis, HIV and malaria; antimicrobial resistance; metabolic diseases, obesity and diabetes; cancer biology, carcinogenesis, oncogenes and tumour suppressor genes; molecular biomarkers and molecular diagnostics.

Artificial Intelligence

Unit I: Mathematical Foundations and Programming

Mathematical Foundations and Aptitude: Discrete Mathematics (sets, relations, functions, combinatorics), Logic and Boolean Algebra, Probability and Statistics, Numerical Ability, Data Interpretation, Logical and Analytical Reasoning.

Programming and Data Structures: Programming in C/C++ and Python, Object-Oriented Programming, Data Structures (arrays, linked lists, stacks, queues, trees, graphs), Algorithm Design, Searching and Sorting Algorithms, Time and Space Complexity Analysis.

Unit II: Computer Systems and Databases

Computer Organization and Operating Systems: Computer Architecture and Organization, Memory Hierarchy, I/O Systems, Processes and Threads, CPU Scheduling, Memory Management, File Systems, Process Synchronization, System Calls, Introduction to Linux/Unix Systems.

Database Management Systems: Data Models, ER Modeling, Relational Model, SQL, Normalization, Transactions, Concurrency Control, Database Security, Backup and Recovery.

Unit III: Computer Networks, Software Engineering, and Security

Computer Networks: OSI and TCP/IP Models, IP Addressing (IPv4/IPv6), Routing and Switching, Common Protocols (DNS, DHCP, HTTP/HTTPS, FTP, SSH), Wireless Networks, Network Diagnostics and Troubleshooting.

Software Engineering: Software Development Life Cycle, Agile Methodologies, Software Design Principles, Testing and Quality Assurance, Version Control (Git), APIs and Web Services.

Cyber Security: Security Principles (CIA Triad), Authentication and Authorization, Cryptography (symmetric/asymmetric), Digital Signatures and PKI, Network Security (firewalls, IDS/IPS, VPNs), Common Threats (malware, phishing), Vulnerability Assessment and Incident Response.

Unit IV: Artificial Intelligence, Data Science, and Computing Infrastructure

Artificial Intelligence and Data Science: AI Fundamentals, Intelligent Agents, Machine Learning (supervised, unsupervised, reinforcement learning), Neural Networks and Deep Learning, Data Preprocessing and Feature Engineering, Model Evaluation, Data Visualization, Transformers, Foundation Models, Large Language Models, Generative AI, Explainable AI, Responsible AI.

Computing Infrastructure and DevOps: Cloud Computing (IaaS, PaaS, SaaS), Virtualization and Containerization (Docker, Kubernetes basics), Parallel and Distributed Computing, High Performance Computing Concepts, Job Scheduling.

Linux and System Administration: Linux Environment, File Systems, User and Permission Management, Process and Service Management, Shell Scripting, Package Management, System Monitoring and Logging, SSH and Automation.

Cyber Security

Unit I: Computer Fundamentals and Operating Systems

- Basics of computers: types of computers, input/output devices, primary and secondary memory, types of software (system, application, utility)
- Number systems (binary, octal, decimal, hexadecimal) and conversions
- Computer organization: CPU, memory hierarchy (cache, RAM, ROM), storage devices (HDD, SSD), BIOS/UEFI and the boot process
- Operating system concepts: functions of an OS, processes, CPU scheduling, memory management, file systems (FAT32, NTFS, ext4)
- Windows administration: user accounts and permissions, Active Directory and LDAP basics, Windows updates
- Linux administration: basic commands, file permissions (chmod, chown), users and groups, package management, basic shell scripting

Unit II: Computer Networks and Network Security

- Basics of networking: types of networks (PAN, LAN, MAN, WAN), topologies, transmission media (twisted pair, optical fibre, wireless)
- OSI and TCP/IP models; TCP vs UDP; common port numbers
- IP addressing: IPv4 classes, public and private IPs, subnetting and CIDR, IPv6 basics, MAC address
- Protocols: ARP, DHCP, DNS, HTTP/HTTPS, FTP, SMTP, SSH, SNMP
- Network devices: hub, switch, router, access point; VLANs; static and dynamic routing (RIP, OSPF basics); NAT
- Wireless networks (802.11 standards) and wireless security (WEP, WPA2, WPA3)
- Network security: firewalls (packet filtering, stateful), ACLs and firewall rules, IDS/IPS, VPN and IPSec, DMZ, proxy servers, network segmentation, switch port security
- Network attacks and tools: DoS/DDoS, IP/ARP/DNS spoofing, sniffing, man-in-the-middle; ping, traceroute, netstat, nslookup, Wireshark, Nmap

Unit III: Information Security and Cryptography

- Basics of cyber security: CIA triad, AAA, threats, vulnerabilities, risk, types of security controls
- Authentication and access control: passwords and password policy, multi-factor authentication, biometrics, DAC, MAC, RBAC, least privilege
- Malware (virus, worm, Trojan, ransomware, spyware), phishing, social engineering, password attacks
- Cryptography: symmetric (DES, AES) and asymmetric (RSA) encryption, hashing (MD5, SHA), digital signatures, digital certificates, PKI, SSL/TLS
- Web security: OWASP Top 10, SQL injection, XSS, CSRF
- Endpoint and email security: antivirus, patch management, spam and spoofed emails

Unit IV: Security Operations, Cyber Forensics and Cyber Laws

- Types of cybercrimes: hacking, identity theft, cyber stalking, financial fraud, data breaches
- Log management: system, firewall and authentication logs; Syslog; SIEM concepts
- Vulnerability assessment and penetration testing: concepts and phases
- Incident response lifecycle: preparation, detection, containment, eradication, recovery, lessons learned
- Cyber forensics basics: digital evidence, evidence acquisition, hashing for integrity, chain of custody
- Cyber laws and standards: IT Act 2000 and amendments, DPDP Act 2023, CERT-In and its incident reporting directions, ISO/IEC 27001 basics, National Cyber Crime Reporting Portal

Renewable Energy & Sustainable Technologies (CREST)

Unit I: Electrical Circuits, Machines and Measurements (25% of Total Marks)

Basic electrical quantities, Ohm's law, Kirchhoff's laws, DC and AC circuit analysis, phasor representation, power in AC circuits, and network theorems. Transformers, DC machines, induction motors and synchronous machines covering construction, operating principles, characteristics and applications. Electrical measurements and instrumentation including analog and digital measuring instruments, CTs, PTs, sensors, transducers, measurement techniques and data acquisition systems.

Unit II: Power Systems, Control and Power Electronics (25% of Total Marks)

Electrical power generation, transmission and distribution systems, substations, switchgear, protection systems, earthing, grounding, lightning protection, substations and switchyards power quality, power factor improvement and electrical safety practices. Fundamentals of control systems including open- and closed-loop systems, transfer functions, stability, PID controllers. Power semiconductor devices, rectifiers, DC–DC converters, inverters, AC voltage controllers, cycloconverters and switch-mode power supplies (SMPS).

Unit III: Renewable Energy Resources and Energy Storage Systems (25% of Total Marks)

Renewable energy resources including solar, wind, biomass, small hydropower, geothermal and ocean energy, grid integration of renewable energy systems, and their applications. Battery energy storage systems, battery characteristics, sizing, charging and discharging principles, Battery Management Systems (BMS), battery safety, testing, maintenance and applications in renewable energy.

Unit IV: Solar Photovoltaic Systems and Power Plants (25% of Total Marks)

Solar photovoltaic (PV) technology, types of solar power plants, site selection and shadow analysis, PV module technology and sizing, inverter selection and sizing, PV array configuration, and basic design of grid-connected and off-grid solar PV systems. Solar power plant components, Solar plant performance evaluation, net and gross metering, operation, maintenance and troubleshooting.

Civil Engineering

UNIT-I: SURVEYING, BUILDING MATERIALS AND CON-CRETE TECHNOLOGY

Principles and methods of surveying; Chain surveying; Compass surveying; Plane table surveying; Lev-elling and contouring; Theodolite surveying and traversing; Tachometric surveying; Curves; Area and volume computation; Total Station; GPS and GIS (basic concepts); Stones; Bricks; Cement; Lime; Aggregates; Timber; Structural steel; Bitumen; Glass; Paints and varnishes; Modern construction materials; Basic testing of construction materials; Ingredients of concrete; Water-cement ratio; Workability of concrete; Batching, mixing, transportation, placing, compaction and curing; Strength and durability of concrete; Concrete mix proportioning (basic concepts); Admixtures; Quality control of concrete.

UNIT-II: ESTIMATION, BUILDING CONSTRUCTION AND CONSTRUCTION MANAGEMENT

Units and methods of measurement; Earthwork estimation; Detailed estimation of buildings; Estimation of roads and culverts; Quantity estimation of RCC works; Bar Bending Schedule (BBS); Analysis of rates; Detailed specifications; Abstract of estimates; Valuation and rent fixation; Measurement Book (MB); Billing and payment procedures; Building components; Foundations; Masonry; Flooring; Roofing; Doors and windows; Damp proofing; Formwork and scaffolding; Contracts and tenders; Construction planning and scheduling; Construction equipment; Quality control; Construction safety; Site management.

UNIT-III: STRENGTH OF MATERIALS, REINFORCED CE-MENT CONCRETE AND SOIL MECHANICS

Stress and strain; Elastic constants; Mechanical properties of materials; Thermal stresses; Shear force and bending moment; Bending stresses; Torsion of circular shafts; Columns and struts; Centre of gravity; Moment of inertia; Introduction to Reinforced Cement Concrete; Working Stress Method and Limit

State Method (basic concepts); Loads on structures; Singly reinforced beams; One-way and two-way slabs; Columns; Footings; Reinforcement detailing; Development length and cover requirements; Basic provisions of IS 456; Formation and classification of soils; Index properties; Soil exploration; Permeability; Compaction; Shear strength; Bearing capacity; Shallow foundations; Deep foundations.

UNIT-IV: TRANSPORTATION AND ENVIRONMENTAL EN-GINEERING

Highway planning; Highway materials; Flexible and rigid pavements; Highway drainage; Traffic signs, signals and road markings; Basic railway engineering; Bridges and bridge components; Sources of water supply; Water quality and treatment; Water distribution systems; Sewerage systems; Sewage treatment and disposal; Solid waste management; Air pollution; Water pollution; Pollution control measures; Basic environmental protection practices.

Mechanical Engineering

Unit I: Manufacturing Processes and Engineering Materials
Manufacturing processes including casting, welding, machining, metal forming; engineering materials including ferrous and non-ferrous metals, alloys, polymers and composites; heat treatment, corrosion, lubrication and material selection for engineering applications.

Unit II: Engineering Drawing, Measurement and Inspection
Engineering drawing and interpretation of mechanical drawings; orthographic projections; assembly and detailed drawings; dimensioning, limits, fits and tolerances; measurement and inspection using Vernier calipers, micrometers, dial indicators and gauges; basic quality control concepts.

Unit III: Mechanical Systems and Thermal Sciences
Engineering mechanics and strength of materials; simple machines and mechanisms; gears, belts, bearings and power transmission systems; internal combustion engines, boilers, refrigeration and air conditioning; pumps, compressors, hydraulics, pneumatics and basic heat transfer concepts.

Unit IV: Automobile Engineering, Emerging Technologies and Laboratory Practices, Fundamentals of automobile engineering including engines, transmission, braking and steering systems; laboratory equipment handling and safety practices; basic automation concepts; awareness of emerging technologies such as electric vehicles, robotics, CNC machines, 3D printing and Industry 4.0; technical documentation and basic computer applications.

Workshop

Unit I: Fitting, Carpentry and Sheet Metal Work
Basic fitting operations and tools; measuring and marking instruments; carpentry tools and woodworking practices; sheet metal operations and fabrication techniques; workshop safety practices.

Unit II: Welding, Smithy and Foundry
Welding processes and equipment; forging and smithy operations; foundry practices and casting processes; workshop tools and safety precautions.

Unit III: Machining, CNC and Metrology
Machine tools including lathe, drilling, milling, shaping and grinding machines; basic CNC machining concepts; engineering drawing interpretation; measurement and inspection using common metrology instruments; limits, fits and tolerances.

Unit IV: Workshop Equipment, Maintenance and Emerging Technologies
Operation and maintenance of workshop equipment; basic mechanical drives and power transmission systems; inventory and workshop management; technical documentation; awareness of robotics, automation, 3D printing and modern manufacturing technologies.

Electrical Engineering

Unit I. Electric Circuits and Electromagnetics

Ideal voltage and current sources, dependent sources, R, L and C elements. Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL), nodal and mesh analysis, network theorems. Transient response and sinusoidal steady-state analysis, resonance, balanced three-phase circuits, star-delta trans-formation, complex power and power factor in AC circuits. Magnetic flux, magnetic field intensity, magnetic circuits, electromagnetic force, self and mutual inductance.

Unit II. Electrical Machines, Drives and Power Electronics

Single-phase transformers: equivalent circuit, phasor diagram, open-circuit and short-circuit tests, volt-age regulation and efficiency; three-phase transformer connections. DC machines: separately excited, series and shunt machines, motoring and generating modes of operation, characteristics and speed con-trol of DC motors. Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control. Synchronous machines: principle of operation, basic performance and characteristics.
Characteristics and applications of SCR, MOSFET and IGBT; controlled and uncontrolled recti-fiers; DC-DC converters (Buck and Boost); single-phase inverters; basic PWM techniques and industrial applications of power electronic converters.

Unit III. Power Systems

Electrical power generation, transmission and distribution systems, substations and their components, transmission lines and cables, insulators, domestic and industrial wiring systems, earthing and ground-ing practices, power factor improvement, voltage regulation, circuit breakers, fuses, isolators, relays, switchgear, over-current and earth-fault protection, electrical energy metering and backup power sys-tems.

Unit IV. Electrical Measurements and Control Systems

Measurement of voltage, current, resistance, power, energy, frequency and power factor; instrument transformers; analog and digital measuring instruments; digital multimeters, clamp meters, wattmeters and energy meters; insulation resistance and earth resistance measurement; oscilloscopes and waveform measurements; measurement errors, accuracy and precision.
Open-loop and closed-loop control systems, feedback principles, transfer functions, block diagrams, transient response characteristics, basic stability concepts, P, PI and PID controllers, and industrial control applications.

Physics

Unit I: Mathematical Methods and Classical Physics

Vector algebra, differentiation and integration, partial differentiation, ordinary differential equations, matrices and determinants, basic error analysis and graphical representation of data. Newton's laws of motion, conservation of energy and momentum, rotational dynamics, centre of mass, gravitation, simple harmonic motion, damped and forced oscillations, wave motion, superposition of waves, standing waves, beats and Doppler effect.

Unit II: Electricity, Magnetism and Electronics

Electrostatics, electric field and potential, capacitance and dielectrics, current electricity, Kirchhoff's laws, magnetic effects of current, electromagnetic induction, alternating current circuits, transformers and basic concepts of electromagnetic waves. Semiconductor physics, p–n junction diode, rectifiers, Zener diode, transistors, amplifier principles, operational amplifiers and their applications, number systems, Boolean algebra, logic gates, flip-flops, counters and basic digital electronic circuits.

Unit III: Modern Physics, Nuclear Physics and Solid-State Physics

Photoelectric effect, atomic models, matter waves, uncertainty principle, quantum numbers, atomic spectra and X-rays. Nuclear properties, radioactivity, nuclear reactions, fission and fusion, radiation detectors and radiation safety. Crystal structure, Miller indices, X-ray diffraction, band theory of solids, conductors, semiconductors and insulators, superconductivity and magnetic properties of materials.

Unit IV: Experimental Physics, Laboratory Techniques

Measurements and units, significant figures, precision and accuracy, estimation and propagation of errors, preparation and interpretation of graphs. Principles, operation and applications of common laboratory instruments including Vernier callipers, screw gauge, travelling microscope, spectrometer, multimeter, cathode ray oscilloscope and basic electronic measuring devices. Performance and understanding of standard undergraduate physics experiments related to mechanics, optics, electricity, electronics and modern physics.

Chemistry

Unit I: General & Inorganic Chemistry

Atomic structure, periodicity of elements, effective nuclear charge, atomic, ionic, crystal and covalent radii, ionization enthalpy, electron gain enthalpy, electronegativity, chemical bonding, ionic, covalent and metallic bonds, weak intermolecular forces, oxidation-reduction reactions, balancing of redox equations, standard electrode potentials and their applications, Brønsted-Lowry and Lewis acid-base concepts, HSAB principle and its applications, chemistry of s-, p-, d- and f-block elements, transition elements, lanthanoids, actinoids, noble gases, coordination compounds including nomenclature, isomerism and bonding concepts, metal ions in biological systems, trace elements, toxicity of Hg, Pb, Cd and As, chelation therapy, and bioinorganic chemistry of iron and its applications.

Unit II: Organic Chemistry & Biomolecules

Hybridization and molecular shapes, inductive, electromeric, resonance, mesomeric and hyperconjugative effects, dipole moment, organic acids and bases, electrophiles and nucleophiles, nucleophilicity and basicity, alkanes, alkenes, alkynes, cycloalkanes, aromaticity, alkyl and aryl halides, alcohols, phenols, ethers, epoxides, aldehydes, ketones, carboxylic acids and their derivatives, heterocyclic compounds, carbohydrates, lipids and proteins.

Unit III: Physical Chemistry

States of matter including gases, liquids and solids, real gases, vapour pressure, surface tension, viscosity, crystalline and amorphous solids, glasses and liquid crystals, thermodynamics, heat, work, internal energy, entropy, Gibbs free energy, chemical equilibrium and equilibrium constants, solutions and colligative properties, phase equilibria, phase rule, phase diagrams, eutectic systems, congruent and incongruent melting points, solid solutions, Nernst distribution law, chemical kinetics, order and molecularity of reactions, Arrhenius equation, activation energy, collision theory, absolute reaction rate theory, surface chemistry, adsorption and adsorption isotherms, electrochemistry, electrochemical cells, EMF, Nernst equation, electrochemical series, photochemistry, Beer-Lambert law, quantum yield, polymers and basic quantum chemistry.

Unit IV: Analytical Chemistry, Instrumentation & Laboratory Techniques

Principles of quantitative analysis, acid-base, redox and iodometric titrations, conductometric and potentiometric methods, UV-Visible spectroscopy, colourimetry, molecular spectroscopy including rotational, vibrational, Raman, electronic, NMR and ESR spectroscopy, thermal and electroanalytical methods, chromatography and separation techniques, determination of melting point, boiling point, surface tension and viscosity, industrial gases and inorganic chemicals, basic knowledge of chemical explosives, accuracy, precision, errors and statistical treatment of data, preparation and standardization of solutions, dilution calculations, filtration, crystallization, distillation and purification techniques, laboratory glassware and equipment, analytical balances, pH and conductivity meters, hot air ovens, muffle furnaces, UV-Visible spectrophotometers, FTIR spectrometers, flame photometers, atomic absorption spectrometers, gas chromatographs, HPLC systems, laboratory safety, handling and storage of chemicals, fire safety, first aid, waste disposal, laboratory housekeeping, inventory and stock management, laboratory records, and computer applications including MS Word and MS Excel.

Zoology

Unit I: Animal Diversity, Taxonomy and Cell Biology.

1.1 Principles of classification.
1.2 Systematics and nomenclature.
1.3 Invertebrate zoology (Salient Features and examples only)
1.4 Vertebrate zoology (Salient Features and examples only)
1.5 Cell structure and function.
1.6 Cell membrane and transport.
1.7 Cell division (mitosis and meiosis).

Unit II: Genetics, Molecular Biology and Immunology.

2.1 Mendelian Genetics.
2.2 Chromosomal inheritance
2.3 DNA replication and Recombinant DNA technology.
2.4 Transcription and translation
2.5 Innate and acquired immunity
2.6 Antigens and antibodies
2.7 Immune responses and Vaccines

Unit III: Ecology, Bio Chemistry and Developmental Biology.

3.1 Ecosystem structure and function
3.2 Food chains and food webs
3.3. Environmental pollution
3.4 Gametogenesis
3.5 Fertilization
3.6 Enzymes
3.7 Nucleic acids

Unit IV: Laboratory Techniques & Laboratory Animal Science.

4.1 Microscopy & Histology
4.2 Tissue processing, Staining & Animal handling techniques
4.3 Specimen preservation & Hematological Techniques
4.4 Care and Breeding of laboratory Animals & Animal Ethics
4.5 Preparation of Various types of Reagents
4.6 Field Survey and Collection of Data
4.7 Different methods used for census of wild Animals and Tagging of Animals.

Computer Science

Unit I: System Administration, Operating Systems and Computer Fundamentals
Computer organization and architecture; CPU, memory hierarchy, storage devices, input/output devices; operating system concepts, processes, threads, memory management, file systems; Windows and Linux administration; user and group management, password policy; file permissions; process and service management; package management; shell and PowerShell basics; Active Directory, LDAP, and Group Policy basics; remote administration; virtualization (including Hyper-V basics); backup and recovery; server security.

Unit II: Computer Networks and Cyber Security
OSI and TCP/IP models; IPv4 and IPv6 addressing basics; subnetting fundamentals; basic routing and switching concepts; common networking devices (router, switch, hub, access point); basic Cisco IOS commands for device configuration; VLANs (concept and use case); NAT (concept and use case); HTTP, HTTPS, FTP, SFTP, SSH, DNS, DHCP, SMTP, POP3 and IMAP protocols; firewalls; VPNs; SSL/TLS basics; Identity and Access Management (IAM) and Multi-Factor Authentication (MFA) — concepts and use cases; endpoint security; common threats — malware, ransomware, phishing; network troubleshooting tools (ping, traceroute, ipconfig/ifconfig, nslookup).

Unit III. Database and Web Server Administration
Relational database concepts; ER model; keys; normalization (up to 3NF); SQL (DDL, DML, DCL, TCL, queries, joins, aggregate functions); database installation, configuration, user management, backup and recovery; MySQL, PostgreSQL and Oracle database administration; HTML, CSS, JavaScript and PHP basics; client-server architecture; REST APIs; Apache, Nginx and IIS web server installation, configuration and management.

Unit IV. IT Support, Troubleshooting and Emerging Technologies
Computer hardware installation and maintenance; BIOS/UEFI; operating system installation and initial configuration; device drivers; end-user software installation; printer and peripheral configuration; system/hardware troubleshooting; password reset and account troubleshooting; cloud computing (IaaS, PaaS, SaaS); containerization (Docker); Git and version control; Artificial Intelligence (AI), Machine Learning (ML) and Generative AI fundamentals and applications in IT.

Environment, Sustainability & Climate Change (ES&CC)

Unit I: Basic Analytical Chemistry and Water Quality Instrumentation

Concentration units (normality, molarity and molality); acid–base reactions, alkalinity and titration; units and standards; principles and applications of pH, conductivity, DO and turbidity meters; TDS estimation; COD analyser/digester, BOD incubator and ion-selective electrode.

Unit II: Laboratory and Analytical Instrumentation

Microscopy, autoclave, centrifuge, muffle furnace and hot-air oven; leaf-area and SPAD meters; IRGA; flame photometer and spectrophotometer; GC-MS, NDIR, HPLC, HPTLC, AAS, ICP-MS, ED-XRF, FTIR and LC-MS.

Unit III: Air Quality and Meteorological Instrumentation

HVAS and RDS for particulate matter monitoring (PM10/PM2.5); gas analysers for SO_2, NOx, CO, O_3 and CO_2; Automatic Weather Station; anemometer, wind vane, hygrometer, barometer, rain gauge and pyranometer.

Unit IV: Geospatial Technologies and Environmental Applications

GPS/GNSS principles and satellite geometry; field survey methods; GIS components and raster/vector data; remote sensing, electromagnetic radiation and spectral signatures; Landsat, Sentinel, IRS and MODIS; applications in watershed management, land-use mapping, pollution monitoring and climate studies.

Mathematical Sciences

Unit–I Introduction to computers, characteristics, applications, generations and classification of computers; basic organization of a computer system; computer hardware and its components including CPU, memory, storage devices, motherboard and peripheral devices; input and output devices; primary and secondary memory; computer software and its types; system software, application software and utility software; operating systems and their functions; programming languages and language translators (compiler, interpreter and assembler); data representation, bits and bytes, binary, decimal, octal and hexadecimal number systems; computer security concepts including malware, viruses, antivirus software, password security and safe computing practices.

Unit II: Introduction to R programming, data structures, data import/export, data manipulation, user-defined mathematical functions, and graphical visualization. Matrix operations and basic linear algebra in R. Descriptive and Inferential statistics in R, random data generation, frequency and contingency tables, and efficient data analysis using the apply family of functions.

Unit III: MATLAB: Introduction to MATLAB, Identify and use various windows, Data types, Rules about variable names, Express numbers in either floating-point or scientific notation, save a series of commands. Built in functions, elementary math functions (common math functions, rounding functions, discrete mathematics functions, and trigonometric functions), data analysis functions (maximum and minimum, mean and median, sums and products), sorting functions, and random numbers.

Unit IV: Introduction to the Excel environment, worksheets, cell and range referencing, and core tools for data analytics. Mathematical and descriptive statistical functions, data management (sorting, filtering, validation, consolidation, etc.), logical and lookup functions, and data visualization using charts and graphs. Introduction to SPSS: data and variable views, data management, Descriptive statistics and Hypothesis testing. Graphical data visualization using SPSS.

Frontier Research Institute of Interdisciplinary Sciences (FRIIS)

Unit I: General Science Fundamentals

Scientific method and observation; Basic concepts of matter, energy, force, and life; States of matter and their properties; Elements, compounds, mixtures, acids, bases, and salts; Living and non-living organisms; Cell structure and basic biological concepts; SI units and scientific measurements; Basic scientific terminology.

Unit II: Laboratory Techniques and Safety

Laboratory organization and housekeeping; Identification, operation, and maintenance of common laboratory equipment; Preparation of basic laboratory solutions and reagents; Cleaning, sterilization, and calibration of laboratory instruments; Laboratory safety rules and precautions; Handling of chemicals, biological materials, glassware, and electrical equipment; Use of personal protective equipment (PPE); Waste segregation, disposal practices, and basic first aid for laboratory accidents.

Unit III: Numerical Ability and Data Handling

Basic arithmetic, percentages, ratios, averages, and unit conversions; Measurement and accuracy; Reading laboratory scales and instruments; Interpretation of simple tables, graphs, and charts; Recording, tabulation, and reporting of laboratory observations; Basic statistical concepts (mean and median); Introduction to quality control and documentation.

Unit IV: Computer Awareness

Basic computer operations and operating systems; MS Word, Excel, and PowerPoint fundamentals; Internet browsing, email, and online communication; Data entry, digital record maintenance, and file management; Basic awareness of laboratory information management systems (LIMS).

Design Innovation Centre (DIC)

Unit I: Electrical and Electronic Fundamentals

- Electric circuits: Independent and dependent sources, R, L and C elements, KCL, KVL, node and mesh analysis, Thevenin's, Norton's, Superposition and Maximum Power Transfer theorems, transient response of DC circuits, resistor and capacitor coding.
- Analog electronics: Diodes, rectifiers, clipping and clamping circuits, BJT and MOSFET basics, operational amplifier applications, regulated power supplies.
- Digital electronics: Number systems, Boolean algebra, Karnaugh maps, combinational and sequential circuits, ADCs and DACs.

Unit II: Electrical Machines, Control and Instrumentation

- Single-phase transformers, DC machines, three-phase induction motors, servo motors and stepper motors.
- Control systems: Mathematical modelling, transfer functions, block diagrams, signal flow graphs, transient and steady-state response, Routh–Hurwitz sta-bility criterion.
- Electrical measurements and instrumentation: Measurement of voltage, cur-rent, power, energy and power factor; instrument transformers, digital multi-meters, oscilloscopes, relays, switches, connectors, oscillators, optoelectronic devices and power supply ICs.

Unit III: Embedded Systems, CAD and Rapid Prototyping

- Microprocessors and microcontrollers, Arduino architecture and program-ming, memory and input/output interfacing, data acquisition systems.
- CAD fundamentals, Autodesk Inventor, 2D and 3D modelling, CAD file formats.
- PCB design and component footprints.
- Rapid prototyping: 3D printing technologies, slicing software, laser engraving and additive manufacturing materials.

Unit IV: Innovation and Intellectual Property Rights

- Design and prototyping workflow.
- Fundamentals of Intellectual Property Rights (IPR): Patents, copyrights, trademarks and industrial designs.
- Overview of the Patents Act, 1970, Patents Rules, 2003, Designs Act, 2000 and Design Rules, 2001, including patent and design filing procedures, forms, applicant categories, timelines and fees.

IT & SS

Unit I – Networking, Web & AV Systems (15 Marks)
OSI/TCP-IP, IPv4/IPv6, subnetting, switching, routing, VLANs, DNS, DHCP, NAT, VPN, wireless networks, firewalls, campus networking, structured cabling, network troubleshooting, web servers (Apache/IIS/Nginx), SSL/TLS, web hosting, smart classrooms, AV systems and streaming.

Unit II – Programming & Databases (10 Marks)
Programming fundamentals (C/C++/Java/Python), scripting, data structures, algorithms, SQL, RDBMS & NoSQL, database administration, backup & recovery, software installation, updates and troubleshooting.

Unit III – Operating Systems & Cloud (13 Marks)
Windows/Linux administration, file systems, users & permissions, Active Directory, Group Policy, backup & disaster recovery, virtualization (VMware, Hyper-V, VirtualBox, Proxmox), cloud computing (IaaS/PaaS/SaaS), Docker, Git and DevOps basics.

Unit IV – Hardware, Security & IT Support (12 Marks)
Computer hardware, Printers, RAID, NAS/SAN, peripherals, preventive maintenance, biometric systems, cybersecurity (CIA, MFA, IDS/IPS, endpoint security, vulnerability assessment), asset management, software deployment and technical documentation.

(ii) Junior Assistant

(i) NEP 2020 and Higher Education Scenario.

(ii) Higher Education Regulatory Bodies and their functions (UGC/AICTE/INC/CoA).

(iii) J&K Civil Service Regulations (introduction).

(iv) Right to Information Act. (Basic concepts).

(v) Drafting / Noting / office Communications.

(vi) Basic concept of University Management System / ERP.

(vii) Office Procedures & Office Management.

(viii) File Management System.

(ix) Maintenance of Records.

(x) Basic use of Information Technology in Offices / E-Office.

(iii) Draftsman

(i) Technical Drawing: Basic principles of technical drawing, Orthographic projection, Isometric and perspective drawings, Dimensioning and scaling, Sectional views. Civil Engineering Drawing and Interpretation: civil engineering drawings, including plans, sections, and elevations, symbols and conventions used in civil engineering drawings, Dimensioning and scaling techniques. Drawing of carpentry joints and Electrical wiring, drawing of floors, slabs, vertical movements (viz.stair, lift well, ramp and escalator), drawing of different types of roof truss. Drafting of Doors, Windows, hand railing, wash basin, and plumbing joints. Provision of safety aspects like Occupational health and Safety, Fire extinguishers, First Aid etc.

(ii) Surveying in Civil Engineering: Leveling: Definition of terms such as level surface. level line, horizontal line, datum surface. Terms used in leveling: foresight, intermediate sight, back sight. change point, height of collimation. Different site survey (using Chain & tape, Prismatic compass, Plane table, leveling instrument, Theodolite), field book entry, plotting, mapping, calculation of area.

(iii) Measurement and Estimation: Estimating and Cost analysis of different types of buildings and structures, estimation techniques and cost calculation methods, units and conversions relevant to construction.

(iv) Computer Applications: Computer applications relevant to drafting, Familiarity with software applications used in drafting and design, Basic troubleshooting skills related to drafting software. CAD (Computer-Aided Design) software such as AutoCAD, SolidWorks, Basic tools and functions in CAD software.

(v) Mathematics: Basic mathematics including geometry and trigonometry relevant to drafting, Calculation of dimensions, angles, and proportions

(iv) Sports Assistant

I. Introduction and meaning, definition and scope of physical education

Introduction, historical development of physical education, aims and objective of physical education, importance of physical education, foundations of physical education, principles of physical education; biological, social and foundations of physical education psychological.

II. Educational technology and methods of teaching in physical education

Introduction, teaching methods & teaching aids, tournaments, lesson planning: meaning, type, principles and lesson plan. General, particular / specific and coaching lesson plan.

III. Kinesiology and biomechanics

Introduction to kinesiology and sports biomechanics, fundamentals concept of anatomy and physiology, mechanical concepts: newton's laws of motion and their application in sports. Projectile: factors influencing projectile trajectory

IV. Measurement and evaluation in physical education

Introduction to test, measurement evaluation, physical fitness tests, aahper youth fitness test, jcr test, cooper's 12-minute run/ walk test, harward step test, motor fitness test, barrow motor ability test. Sports skill tests lockhart and mcpherson badminton test, johnson basketball test, mcdonald soccer test.

V. Sports training

Introduction to sports training, methods of sports training, training components, Training process, training program and planning

VI. Sports psychology and sociology

Introduction, learning, personality, motivation, relation between social sciences & physical education, personality, motivation.

VII. Sports medicine, physiotherapy and rehabilitation

Meaning, definition, and importance of sports medicine, physiotherapy, hydrotherapy and massage, hydrotherapy: meaning and methods, cryotherapy, contrast bath, whirlpool bath, steam bath, sauna bath, hot water fomentation, classification of therapeutic exercise: passive movements (relaxed, forced and passive stretching).

VIII. Sports management

Concept of management, functions of management, leadership, sports management, sports management in schools, colleges and universities. Planning, directing and controlling school, college and university sports programmes. Factors effecting the planning.

IX. Concepts of yoga

Meaning, definition & scope of yoga, aims, objectives and functions of yoga, early yoga practices, basic yogic methods, *asana*: classification of *asanas*, sitting, standing, lying, inverted *asanas.* Benefits of *asanas*: effects of *asanas* on general health. *Pranayama*: importance & impact on muscular, cardio respiratory and nervous system. Relaxation and meditation: importance & impact on body at work and body at rest.

X. Knowledge of sports/games

Athletics, badminton, football, cricket, volleyball, martial arts, basketball, table tennis, carrom, chess.

(v) Medical Assistant

(i) Basic Medical information, Drugs and Antibiotics, their properties and uses.

(ii) Pharmaceutical Process and methods

(iii) First Aid and Home Nursing, Health Education, emergency health care services

(iv) Structure and functions of the body.

(v) Cardio Pulmonary Resuscitation (CPR)

(vi) Wounds, Electric shock, Asphyxia, etc.

(vii) Use of common medicines, home nursing.

(viii) treatment of fractures, strains and sprains and application of splints.

(ix) Community Pharmacy and Management.

(x) Sterilizations and disinfection.

(xi) Health Education.

(xii) Public health & hygiene.

(xiii) Anatomy and Physiology, Public health & Hygiene, Diseases, etc.

(xiv) National Health Programmes.

(xv) Nutrition and metabolism.

(xvi) Nursing in special diseases.

(xvii) Immunity and infectious diseases.

(xviii) Special drugs their control and administration.

(vi) Workshop Mechanic

(i) Foundry Shop: Understanding of basic steps in casting operation, terminology, process flow; mold making process and tools; sand testing equipment; working and operation of equipment used in casting shop; Safety precautions for foundry.

(ii) Machine Shop: Standard machine tools and their operations; Cutting tools for various machines, cutting tool materials, tool geometry; Cutting fluids, classification; Grinding machine types and operations, types of grinding wheels, specifications; Safety precautions for machine shop

(iii) Assembly Shop: Processes in fitting shop; Equipment; Layout procedure; File work; Thread cutting tools; Operation and types of chisels, scrapers, dividers, calipers.

(iv) Welding Shop: Welding processes and equipment; operations of welding machines; selection of consumables such as electrode, flux, nozzles, gas etc.; types of welds, joints and positions; Safety precautions for welding

(v) Smithy, Forging and Sheet Metal Work: Knowledge of equipment and tools for smithy, forging and sheet metal work; Press tools, molds, Operations related to Smithy, forging and sheet metal work; Knowledge of control parameters to achieve defect-free parts; safety precautions

(vi) Metrology: Understanding related to operation and working principles of measuring equipment and tools used for inspection on shop floor; Knowledge of standards of measurement; Measurement of Surface roughness, Knowledge of fits and tolerances (geometric dimensioning and tolerances).

(vii) Advanced Manufacturing: Operation and working principles of advanced manufacturing and inspection equipment such as CNC Machines, 3-D Printers; Basic understanding of Computational tools for component fabrication.

(viii) Process Engineering: Process sheet, Machining time calculations, Jigs and Fixtures.

(ix) Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

(x) General Skills: Understanding of engineering drawing, Planning & performing simple repair, overhauling of different machines and checking functionality, skills to execute pipe joints, dismantling and assembling valves and fittings. Testing for leakages, planning and performing basic day to day preventive maintenance, safety aspects, Knowledge of GFR with prior experience of framing technical specifications and preparation of tender documents.

ISLAMIC UNIVERSITY OF SCIENCE & TECHNOLOGY, KASHMIR

OFFICE OF THE RECRUITMENT

ANNEXURE- "B"

Syllabus for the post of (i) Assistant Registrar (ii) Assistant Controller of Examinations (iii) Assistant Engineer (Electrical) advertised vide No. 06 of 2026 Dated: 12-06-2026

PART-A

(Maximum Marks 25) **(Minimum / Qualifying Marks 12.5)**

a) **General Knowledge:**
Indian History, Indian Geography, Indian Economy, Indian Polity & Constitution, Current Affairs-India & World.

b) **General English**
Vocabulary, Sentence structure, synonyms, antonyms, and its correct usage. Basic comprehension and writing ability. One-word substitution, Improvement of Sentences, Spellings, Grammar, Sentence Completion, Phrases and Idiomatic use of words.

c) **Numerical Ability**
Number Systems, Computation of Whole Numbers, Decimals and Fractions and relationship between Numbers, Fundamental arithmetical operations, Percentages, Ratio and Proportion, Averages, Interest, Profit and Loss, Discount, Mensuration, Time and Distance, Ratio and Time, Time and Work.

d) **General Intelligence & Reasoning**
Questions of verbal, non-verbal, and analytical types, analogies, syllogism, similarities, differences, missing numbers, characters and sequences, space visualization, problem-solving, analysis, decision making, visual memory, discrimination, observation, relationship concepts, direction sense, coding decoding, arithmetical reasoning, verbal and figure classification, data representation, and analysis, arithmetical number series.

e) **Fundamentals of Computer Sciences.**
Hardware & Software, Input and output devices, Operating systems, Computer languages and basics of networking, M.S Office and its applications, E-mail & Internet, E-0ffice, Digitization, File tracking systems, Role of Information Technology in Governance, ERP.

ISLAMIC UNIVERSITY OF SCIENCE & TECHNOLOGY, KASHMIR

OFFICE OF THE RECRUITMENT

Syllabus For Written Test (Domain Knowledge) for the post (s) of (i) Assistant Registrar (ii) Assistant Controller of Examinations (iii) Assistant Engineer (Electrical)

PART-B

(Maximum Marks 55) **(Minimum / Qualifying Marks 27.5)**

(i) Assistant Registrar/ (ii) Assistant Controller of Examinations

- Overview of Higher Education in India
- General Financial Rules- and purchase procedures
- New Pension Scheme
- J&K Civil Service Regulations. J&K Civil Service Leave Rules, 1979.
- UT Universities' Acts & Statutes.
- UGC Act 1956 / UGC Regulations 2018 on minimum qualifications for appointment of teachers and other academic staff in Universities and Colleges / UGC Regulations 2022 on Minimum Standards and Procedures for Award of Ph.D. Degree.
- Higher Education Regulatory Bodies, UGC, AICTE, CoA, and INC.
- National Educational Policy-2020
- Reservation and Concessions to SCs/STs/OBCs/PWDs/EWSs
- NAAC.
- The Right to Information Act, 2005.
- Government e-Marketplace.
- Office Procedures & Office Management.
- University Ranking (NIRF, IIG).
- University Management System
- Examination Rules & Regulations (for the post of Assistant CoE only)

(iii) Assistant Engineer (Electrical)

- Primary and secondary cells, Dry accumulators, Solar Cells, Steady state analysis of d.c. and a.c. network, network theorems; network functions, Laplace techniques, transient response; frequency response; three-phase networks; inductively coupled circuits.
- Mathematical modelling of dynamic linear systems, transfer functions, block diagrams; stability of control systems.
- Electrostatic and magnetostatic field analysis; Maxwell's equations. Wave equations and electromagnetic waves.
- Basic methods of measurements, standards, error analysis; indicating instruments, cathode ray oscilloscope, measurement of voltage; current; power resistance, inductance, capacitance, frequency, time and flux, electronic meters.
- Vaccum based and Semiconductor devices and analysis of electronic Circuits; single and multistage audio, and radio, small signal and large signal amplifiers: oscillators and feedback amplifiers; wave shaping circuits and time base generators: multi-vibrators and digital circuits; modulation and demodulation circuits, Transmission line at audio, radio and U.H. Frequencies; Wire and Radio communication.
- Generation of e.m.f. and torque in rotation machine; motor and generator characteristics of d.c. synchronous and induction machines, equivalent circuits; commutation starters; phaser diagram, losses, regulation, power transformers.
- Modelling of transmission lines, steady, state and transient stability, surge phenomena and insulation coordination; protective devices and schemes for power system equipment.
- Conversion of a.c. to d.c. and d.c. to a.c. controlled and uncontrolled power, speed control techniques for drives.

******End of Syllabus******